

REMARKS

This Amendment is being filed in response to the Office Action mailed July 20, 2009, which has been reviewed and carefully considered. Reconsideration and allowance of the present application in view of the amendments made above and the remarks to follow are respectfully requested.

Claims 1-7, 10-17, and 25-28 are pending in the Application. Claims 1, 7, 10 and 17 are independent.

In the Office Action, the objection to FIG 6 is maintained since the amendments to the specification included in the Amendment filed on May 18, 2009 is considered new matter. This objection to FIG 6 is traversed. However, in the interest of advancing prosecution, the specification has been amended to remove the alleged new matter. It is respectfully submitted that the objection to the drawings has been overcome and an indication as such is respectfully requested.

In the Office Action, the specification is objected to for allegedly including new matter in the amendment to the specification filed on May 18, 2009. This objection is

respectfully traversed. However, in the interest of advancing prosecution, the specification has been amended to remove the alleged new matter. It is respectfully submitted that the objection to the specification has been overcome and an indication as such is respectfully requested.

In the Office Action, claims 1-7, 10-17 and 25-28 are rejected under 35 U.S.C. §112, first paragraph. This rejection is respectfully traversed. However, in the interest of advancing prosecution, independent claims 1, 7, 10 and 17 have been amended to remove the alleged informality. Accordingly, withdrawal of this rejection is respectfully requested.

In the Office Action, claims 1, 4-7, 10, 13-14, 16 and 25-27 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 6,354,008 (Domoto) in view of JP 60-162766 (Oiwa), U.S. Patent No. 5,953,969 (Rosenhan) and Applicants' Admitted Prior Art (AAPA), and in witness of an Article by Liang et al. entitled "Low Pressure Plasma Arc Source Ion Nitriding Compared with Glow-Discharge Plasma Nitriding of Stainless Steel" (Liang), an Article by Blawert et al. entitled "Surface Treatment of Nitriding Steel 34CrAlNi7: Comparison between Pulsed Plasma Nitriding and Plasma Immersions

ion Implantation" (Blawert), and book by Askeland entitled "The Science and Engineering of Materials" (Askeland). Further, claims 2-3 and 11-12 are rejected under 35 U.S.C. §103(a) unpatentable over Domoto in view of U.S. Patent No. 5,857,260 (Yamada). Claim 15 is rejected under 35 U.S.C. §103(a) over Domoto in view of U.S. Patent No. 6,584,691 (Gerasimov). Claims 17 and 28 are rejected under 35 U.S.C. §103(a) over Domoto in view of U.S. Patent No. 4,259,126 (Cole). Applicants respectfully traverse and submit that claims 1-7, 10-17, and 25-28, as amended, are patentable over Domoto, Oiwa, AAPA, Rosenhan, Liang, Blawert, Askeland, Yamada, Gerasimov and Cole for at least the following reasons.

Domoto is directed to a sliding member having a sliding surface 2 for sliding contact with a cooperative member. A protective film 5b is deposited not only on the sliding surface 2 but also on a surface region immediately adjacent the sliding surface 2. As correctly noted on page 6 of the Office Action, second paragraph, Domoto does not disclose or suggest that a cutting element is precipitationally hardened simultaneously with the plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a

diffusion layer. Oiwa and Rosenhan are cited in an attempt to remedy the deficiencies in Domoto.

Oiwa is directed to an electric razor where a dense nitride film is formed on the surface of the outer blade to improve the durability and to reduce a sliding load. The outer blade is made of Ni or stainless steel and the dense nitride film is formed on the surface of the outer blade by plasma nitriding.

Rosenhan is directed to screwdriver bit where its surface is hardened due to nitrating, and has softer region of a core. As clearly shown in FIG 2, the hardness decreases away from the center to reach a plateau near the center.

It is respectfully submitted that Domoto, Oiwa, Rosenhan, and combination thereof, do not teach or suggest the present invention as recited in independent claim 1, and similarly recited in independent claims 7, 10 and 17 which, amongst other patentable features, recites (illustrative emphasis provided):

wherein the cutting element is precipitationally hardened simultaneously with the plasma nitriding on all surfaces of the cutting element to form a surface top layer of steel supersaturated with nitrogen and a diffusion layer adjoining the top layer with a hardness ranging from the hardness of the top

layer to the hardness of the steel before hardening so that the top layer has a substantially uniform hardness and the diffusion layer has a decreasing hardness with depth of the diffusion layer, the decreasing hardness of the diffusion layer decreasing from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center.

A cutting element which is precipitationally hardened simultaneously with the plasma nitriding is nowhere disclosed or suggested in Domoto Oiwa, and Rosenhan, alone or in combination. Rather, column 2, lines 27-29 of Rosenhan merely recites that "heat treatment--age-hardening or precipitation-hardening--is to be combined with plasma nitrating." It is respectfully submitted that such a disclosure does not teach or suggest to precipitationally harden a cutting element simultaneously with the plasma nitriding, as recited in independent claims 1, 7, 10 and 17.

Further, the noted section of AAPA, namely, page 4, lines 26-28 does NOT describe the prior art; rather this description is related to the present invention.

Assuming, arguendo, that somehow the combination of Domoto, Oiwa and Rosenhan discloses or suggests to harden a cutting element

simultaneously with the plasma nitriding, it is respectfully submitted that the combination of Domoto, Oiwa and Rosenhan still does not disclose or suggest a diffusion layer with decreasing hardness that decreases "from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center," as recited in independent claim 1, and similarly recited in independent claims 7, 10 and 17. Rather, Rosenhan shows in FIG 2 that the hardness decreases away from the center to reach a plateau near the center.

A diffusion layer with decreasing hardness that decreases "from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center," as recited in independent claim 1, and similarly recited in independent claims 7, 10 and 17, is NOT intrinsic to the process of hardening, as alleged on page 8, second full paragraph of the Office Action. Rather, the hardening may be performed to form a uniformly hardened steel, or a steel with a hardness that decreases away from the center to reach a plateau near the center, as shown in FIG 2 of Rosenhan.

For example, the specification recites on page 5, lines 3-6 that:

If the blade was uniformly hardened through and through to a hardness of 1500 HV, it would become very brittle and consequently would snap easily. With the process according to the invention this disadvantage is avoided.  
(Emphasis added)

Accordingly, a diffusion layer with decreasing hardness that decreases "from outer portions of the diffusion layer toward a center of the diffusion layer and meeting at the center of the diffusion layer to form a minimum peak at the center," as recited in independent claim 1, and similarly recited in independent claims 7, 10 and 17, is NOT intrinsic to the process of hardening, and provides substantial benefits. Rather, hardening may be performed to provide a uniform hardness throughout the blade, or may be performed to provide plateau below the surface, as in Rosenhan. AAPA, Liang, Blawert, Askeland, Yamada, Gerasimov and Cole are cited to allegedly show other features and do not remedy the deficiencies in Domoto, Oiwa and Rosenhan.

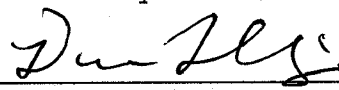
Accordingly, it is respectfully submitted that independent claims 1, 7, 10 and 17 should be allowable. In additions, claims

2-7, 11-16, and 25-28 should be allowable at least based on their dependence from independent claims 1, 7, 10 and 17.

In addition, Applicants deny any statement, position or averment of the Examiner that is not specifically addressed by the foregoing argument and response. Any rejections and/or points of argument not addressed would appear to be moot in view of the presented remarks. However, Applicants reserve the right to submit further arguments in support of the above stated position, should that become necessary. No arguments are waived and none of the Examiner's statements are conceded.

In view of the above, it is respectfully submitted that the present application is in condition for allowance, and a Notice of Allowance is earnestly solicited.

Respectfully submitted,

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